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10/763,645	01/22/2004	Jayati Ghosh	10030722-1	7708

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EXAMINER	
ABDI, AMARA	
ART UNIT	**PAPER NUMBER**
2624	

NOTIFICATION DATE	DELIVERY MODE
01/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPOPS.LEGAL@agilent.com

Office Action Summary	Application No.	Applicant(s)	
	10/763,645	GHOSH ET AL.	
	Examiner	**Art Unit**	
	Amara Abdi	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _06 October 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-9,11 and 14-20_ is/are pending in the application.

4a) Of the above claim(s) _10,12 and 13_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-9,11 and 14-20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _01/22/2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

2. Applicant's arguments with respect to claims 1-11, and 14-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 9, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Yakhini et al. (EP 1 162 572).

(1) Regarding claims 1 and 9:

Yakhini et al. teach a method and computer program (paragraph [0015], lines 1-2) for classifying pixels of a microarray image with observed intensities (intensity of pixels ranging from 0 to 9) within a region of interest (grid of pixels square area of scanned image) (Fig. 5, page 6, paragraph [0022], and (Figs. 31, 32, paragraph [0067]), the method comprising:

initially classifying pixels in the region of interest (grid of pixels) as either feature pixels (pixels with low or zero intensity values) or background pixels (pixels with intensity values of non-zero) (Figs 31, 32 paragraph [0067]) based on the intensities of

the pixels (the intensity of the pixels ranging from 0 to 9) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]); and

iteratively computing, for pixels within the region of interest (grid of pixels square area of scanned image), probabilities (statistical metric) (paragraphs [0068], [0069], [0070]) that the pixels are feature pixels (feature pixel with lowest intensity) (Fig. 32, pages 14-15, paragraph [0067], lines 17-18), and probability (statistical metric) (paragraphs [0068], [0069], [0070]) that the pixels are background pixels (Fig.31, page 15, paragraph [0067], lines 16-17), based on pixel location (location metric) (paragraph [0068], lines 20-21) and intensities (intensity of pixels) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]), and accordingly classifying the pixels as either feature or background pixels (Figs. 31, 32, paragraph [0067])

(2) Regarding claim 2:

Yakhini et al. further teach the method of claim 1, wherein a feature pixel and background classification is stored in a feature mask (paragraph [0030], lines 5-6).

(3) Regarding claim 3:

Yakhini et al. further teach the method of claim 2, wherein the feature mask (paragraph [0030], lines 5-6) includes binary values corresponding to pixels in the region of interest (paragraph [0037], lines 4-5), a first binary value (binary value 1) indicating that a corresponding pixel is a feature pixel (paragraph [0037], lines 5-6) and second binary value (binary value 0) indicating that a corresponding pixel is a background pixel (paragraph [0037], lines 6-7).

(4) Regarding claim 4:

Yakhini et al. further teach the method of claim 1 wherein classifying pixels in the region of interest (grid of pixels) (Figs. 31, 32, paragraph [0067) as either feature pixels (pixels with low or zero intensity values) or background pixels (pixels with intensity values of non-zero) based on the observed intensities of the pixels (the intensity of the pixels ranging from 0 to 9) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]) further includes:

determining a high pixel intensity (dark) and a low pixel intensity (blank) for the region of interest (rectangular portion) (Fig. 19, paragraph [0039], lines 10-12);

determining an intermediate point (the average or mean or threshold) between the high pixel intensity and a low pixel intensity (paragraph [0039], lines 13-14);

classifying pixels with observed pixel intensities greater than or equal to the intermediate point (threshold of 9) as feature pixels (dark pixels) and classifying pixels with observed pixel intensities less than the intermediate point (threshold of 9) as background pixels (blank pixels) (paragraph [0039], lines 8-14); and

iteratively reclassifying pixels based on an intermediate intensity between the mean intensity of feature pixels and the mean intensity of background pixels (paragraph [0040]).

(5) Regarding claim 11:

Yakhini et al. further teach a computer medium encoded with computer executable instructions (paragraph [0015], lines 1-2) that implement a feature extraction program (paragraph [0001], lines 1-3) that includes a feature location

(paragraph [0005], lines 6-7) and size determination step (paragraph [0034], lines 1-3) that includes the method for classifying pixels with observed intensities within the region of interest (grid of pixels) of claim 1 (Figs 31, 32 paragraph [0067]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yakhini et al. (EP 1 162 572) in view of Lee et al. (US-PGPUB 2004/0202368).

Yakhini et al. teach the parental claim 1. However, Yakhini et al. do not teach explicitly the identifying of hole pixels that are feature pixels surrounded by background pixels and background pixels surrounded by feature pixels and reclassifying hole pixels in order to increase the continuity of feature-pixel and background pixel classification with respect to location within the region of interest.

Lee et al., in analogous environment, teaches a learnable object segmentation, where detecting the hole pixels as feature pixels surrounded by background pixels and background pixels surrounded by feature pixels (paragraph [0084], line 2-8), (the examiner interpreted that some of feature pixels are within the boundary, and some of the them are outside the region of interest, and the same thing applies to the background pixels). And reclassifying the hole pixels in order to increase the continuity

of feature-pixel and background pixel classification with respect to location within the region of interest (paragraph [0121], line 3-11; and paragraph [0123], line 3-6), (the increasing of the continuity of feature-pixel and background pixel classification is read as filling the holes to remove extraneous pixels and smooth region boundaries).

It is desirable to provide an accurate and robust method for object segmentation on complicated object types, as well as providing a semi-automatic method for user to train the segmentation recipe. The Lee's approach, where identifying the hole pixels is to achieve this goal. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to apply the Lee et al. teaching, where identifying the hole pixels, with Yakhini et al. teaching, because such combination provides an accurate and robust method for object segmentation on complicated object types, as well as providing a semi-automatic method for user to train the segmentation recipe (paragraph [0010], line 2-6).

7. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yakhini et al. (EP 1 162 572) in view of Bow et al. (STIC), (pattern recognition and image preprocessing [electronic resource]).

(1) Regarding claim 6:

Yakhini et al. teach the parental claim 1. However, Yakhini et al. do not teach explicitly the method, where classifying the pixel as feature when P(F/I,x)>=P(B/I,x); until a maximum number of iterations are performed.

Bow, sing-Tze, in analogous environment, teaches a pattern recognition and image preprocessing, where using Bayes discriminant function for given probability function that the state nature is a pattern belonging to certain class (the examiner interpreted that P(wi/x) has the same concept as P(F/I,x) and P(B/I,x)) (Page 85, line 16-22). Also classifying a pixel as a feature pixel when {P(x/wk)P(wk)> P(x/wi)P(wi)} (Page 87, line 21-24), (the examiner interpreted that P(F/I,x)= P(x/wk)P(wk), and P(B/I,x)= P(x/wi)P(wi)), until a maximum number of iterations are performed (Page 88, line 7-10).

It is desirable to speed up the processing of an image. The Bow's approach, where classifying the pixel as feature when P(F/I,x)>=P(B/I,x); until a maximum number of iterations are performed is to achieve this goal. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to apply the Bow's teaching, where classifying the pixel as feature when P(F/I,x)>=P(B/I,x); until a maximum number of iterations are performed, with Yakhini et al. teaching, because such combination speeds up the processing of an image, it is therefore necessary to explore a way to accurately represent the image with much less amount of data but without losing any important information for the interpretation (Page 10, line 31-35).

(2) Regarding claim 7:

Yakhini et al. and Bow teach the parental claim 6. Furthermore, Bow, sing-Tze teaches a pattern recognition and image preprocessing, where the Baye's discriminant function is written as: P(wi/x)={P(x/wi)*P(wi)}/ P(x) (Page 85, line 16), (the examiner interpreted that P(wi/x) has the same concept as P(F/I,x) and P(B/I,x)), and

$\{P(x/wk)P(wk) > P(x/wi)P(wi)\}$, where : $P(F/I,x) = P(x/wk)P(wk)$, and $P(B/I,x) = P(x/wi)P(wi)$ (Bow: Page 87, line 21-24).

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yakhini et al. and Bow et al. (STIC), as applied to claim 7 above, and further in view of Padilla et al. (US-PGPUB 2003/0233197).

The combination Yakhini et al. and Bow et al. (STIC) teach the parental claim 7. However, Yakhini et al. and Bow et al. do not teach explicitly where Bayesian posterior probabilities are calculated for each channel of a two-channel microarray.

Padilla et al., in analogous environment, teaches a discrete Bayesian analysis of data, where using microarray to contain a human genes including intensities (paragraph [0312], line 10-13), and a series of channel grooves, or spots are formed on substrate and reagents are selectively flowed through the channels (paragraph [0085], line 15-18).

It is desirable to identify conditions or perturbations, for diagnosis or for other predictive analysis. The Padilla's approach, where Bayesian posterior probabilities are calculated for each channel of a two-channel microarray is to achieve this goal. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to apply the Padilla et al. teaching, where Bayesian posterior probabilities are calculated for each channel of a two-channel microarray, with the combination Yakhini et al. and Bow et al., because such feature predicts outcomes of

other conditions or perturbations or to identify conditions or perturbations, for diagnosis or for other predictive analysis (paragraph [0008], line 11-13).

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yakhini et al. (EP 1 162 572) in view of Shames (US 6,990,221).

(1) Regarding claim 14:

Yakhini et al. disclose a feature-extraction system (paragraph [0001], lines 1-3) comprising:

a means for receiving and storing a scanned image of a microarray (paragraph [0003], line 3-4);

a gridding means for determining putative feature positions (paragraph [0018], line 2-3) and sizes (paragraph [0034], line 1-2) within the scanned image of the microarray (paragraph [0001], line 3-4);

feature-mask-generating logic that classifies pixels as feature-pixels and background-pixels (paragraph [0001], line 1-4) based on pixel locations (paragraph [0005], line 1-8) and intensities (paragraph [0004], line 7-10);

a feature extraction module that extracts signal data from the scanned image of the microarray (paragraph [0001], lines 1-3, and paragraph [0006], line 8-10).

However, Yakhini et al. do not teach explicitly the preview-mode display logic that displays feature positions and sizes obtained from the generated feature mask, solicits feedback from a user, and corrects the feature positions and sizes.

Shams, in analogous environment, teaches an automated and array image segmentation and analysis, where displaying feature positions and sizes obtained from the generated feature mask (col. 10, lines 41-41), (the displaying of the image frame is read as the same concept as the displaying of the feature positions and sizes), solicits feedback from a user (col. 10, lines 51-54), and corrects the feature positions (col. 10, lines 49-50), and sizes (col. 2, lines 24-26), (the adjusting of position and size is read as the same concept as the correcting of position and size);

It is desirable to process irregular micro-array patterns, search for DNA image spots, and accurately quantify, and intuitively display, specific signals while accounting for the local background. The Shams approach, where displaying the image frames is to achieve this goal. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to apply the Shams teaching, where displaying the image frames, with the Yakhini et al. teaching, because such combination processes irregular micro-array patterns, search for DNA image spots, and accurately quantify, and intuitively display, specific signals while accounting for the local background (col. 3, lines 10-16).

(2) Regarding claim 15:

Yakhini et al. and Shams teach the parental claim 14. Furthermore, Yakhini et al. teach a feature extraction system (paragraph [0001], lines 1-3) for classifying pixels as feature pixels (pixels with low or zero intensity values) and background pixels (pixels with intensity values of non-zero) (Figs. 31, 32, paragraph [0067]) based on pixel locations (location metric) (paragraph [0068], lines 20-21) and intensities (the intensity

of the pixels ranging from 0 to 9) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]) by:

initially classifying pixels in the region of interest (grid of pixels) as either feature pixels (pixels with low or zero intensity values) or background pixels (pixels with intensity values of non-zero) (Figs 31, 32 paragraph [0067]) based on the intensities of the pixels (the intensity of the pixels ranging from 0 to 9) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]); and

iteratively computing, for pixels within the region of interest (grid of pixels square area of scanned image), probabilities (statistical metric) (paragraphs [0068], [0069], [0070]) that the pixels are feature pixels (feature pixel with lowest intensity) (Fig. 32, pages 14-15, paragraph [0067], lines 17-18), and probability (statistical metric) (paragraphs [0068], [0069], [0070]) that the pixels are background pixels (Fig.31, page 15, paragraph [0067], lines 16-17), based on pixel location (location metric) (paragraph [0068], lines 20-21) and intensities (intensity of pixels) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]), and accordingly classifying the pixels as either feature or background pixels (Figs. 31, 32, paragraph [0067])

(3)Regarding claim 16:

Yakhini et al. and Shams teach the parental claim 14. Furthermore, Yakhini et al. teach a feature extraction system (paragraph [0001], lines 1-3) wherein a feature pixel and background classification is stored in a feature mask (paragraph [0030], lines 5-6).

(4) Regarding claim 17:

Yakhini et al. and Shams teach the parental claim 15. Furthermore, Yakhini et al. teach a feature extraction system (paragraph [0001], lines 1-3) wherein classifying pixels in the region of interest (grid of pixels) (Figs. 31, 32, paragraph [0067) as either feature pixels (pixels with low or zero intensity values) or background pixels (pixels with intensity values of non-zero) based on the observed intensities of the pixels (the intensity of the pixels ranging from 0 to 9) (Figs. 2 and 5, paragraph [0004], lines 7-20 and paragraph [0022]) further includes:

determining a high pixel intensity (dark) and a low pixel intensity (blank) for the region of interest (rectangular portion) (Fig. 19, paragraph [0039], lines 10-12);

determining an intermediate point (the average or mean or threshold) between the high pixel intensity and a low pixel intensity (paragraph [0039], lines 13-14);

classifying pixels with observed pixel intensities greater than or equal to the intermediate point (threshold of 9) as feature pixels (dark pixels) and classifying pixels with observed pixel intensities less than the intermediate point (threshold of 9) as background pixels (blank pixels) (paragraph [0039], lines 8-14); and

iteratively reclassifying pixels based on an intermediate intensity between the mean intensity of feature pixels and the mean intensity of background pixels (paragraph [0040]).

10. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yakhini et al. and Shames, as applied to claim 15 above, and further in view of Bow et al. (STIC), (pattern recognition and image preprocessing [electronic resource]).

(1) Regarding claim 18:

The combination Yakhini et al. and Shames teach the parental claim 15. However, the combination Yakhini et al. and Shames do not teach explicitly the system, where classifying the pixel as feature when P(F/I,x)>=P(B/I,x); until a maximum number of iterations are performed.

Bow, sing-Tze, in analogous environment, teaches a pattern recognition and image preprocessing, where using Bayes discriminant function for given probability function that the state nature is a pattern belonging to certain class (the examiner interpreted that P(wi/x) has the same concept as P(F/I,x) and P(B/I,x)) (Page 85, line 16-22). Also classifying a pixel as a feature pixel when {P(x/wk)P(wk)> P(x/wi)P(wi)} (Page 87, line 21-24), (the examiner interpreted that P(F/I,x)= P(x/wk)P(wk), and P(B/I,x)= P(x/wi)P(wi)), until a maximum number of iterations are performed (Page 88, line 7-10).

It is desirable to speed up the processing of an image. The Bow's approach, where classifying the pixel as feature when P(F/I,x)>=P(B/I,x); until a maximum number of iterations are performed is to achieve this goal. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to apply the Bow's teaching, where classifying the pixel as feature when P(F/I,x)>=P(B/I,x); until a maximum number of iterations are performed, with the combination Yakhini et al. and Bow, because such feature speeds up the processing of an image, it is therefore necessary to explore a way to accurately represent the image with much less amount of

data but without losing any important information for the interpretation (Page 10, line 31-35).

(2) Regarding claim 19:

Yakhini et al. and Bow teach the parental claim 6. Furthermore, Bow, sing-Tze teaches a pattern recognition and image preprocessing, where the Baye's discriminant function is written as: P(wi/x)={P(x/wi)*P(wi)}/ P(x) (Page 85, line 16), (the examiner interpreted that P(wi/x) has the same concept as P(F/I,x) and P(B/I,x)), and {P(x/wk)P(wk)> P(x/wi)P(wi)}, where : P(F/I,x)= P(x/wk)P(wk), and P(B/I,x)= P(x/wi)P(wi) (Bow: Page 87, line 21-24).

11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yakhini et al., Shames, and Bow et al., as applied to claim 19 above, and further in view of Padilla et al. (US-PGPUB 2003/0233197).

The combination Yakhini et al., Shames, and Bow et al. teach the parental claim 19. However, the combination Yakhini et al., Shames, and Bow et al. do not teach explicitly the system, where Bayesian posterior probabilities are calculated for each channel of a two-channel microarray.

Padilla et al., in analogous environment, teaches a discrete Bayesian analysis of data, where using microarray to contain a human genes including intensities (paragraph [0312], line 10-13), and a series of channel grooves, or spots are formed on substrate and reagents are selectively flowed through the channels (paragraph [0085], line 15-18).

It is desirable to identify conditions or perturbations, for diagnosis or for other predictive analysis. The Padilla's approach, where Bayesian posterior probabilities are calculated for each channel of a two-channel microarray is to achieve this goal. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to apply the Padilla et al. teaching, where Bayesian posterior probabilities are calculated for each channel of a two-channel microarray, with the combination Yakhini et al. and Bow et al., because such feature predicts outcomes of other conditions or perturbations or to identify conditions or perturbations, for diagnosis or for other predictive analysis (paragraph [0008], line 11-13).

Contact Information:

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amara Abdi whose telephone number is (571)270-1670. The examiner can normally be reached on Monday through Friday 8:00 Am to 4:00 PM E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jingge Wu/
Supervisory Patent Examiner, Art Unit 2624

/Amara Abdi/
Examiner, Art Unit 2624